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A new species of *Lepiota* (*Agaricaceae*) from southwestern China

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Abstract — A new species, *Lepiota pallidiochracea*, is described. It is characterized by the ochraceous-red squamules on pileus, large ellipsoid to oblong spores, polymorphic cheilocystidia, and a trichodermium of elongate pileus covering, which is apically attenuate.

Kew words — *Agaricales,* lepiotaceous fungi, taxonomy

Introduction

The eastern Himalaya is one of the twenty-five hotspots for biodiversity (Myers et al 2000), and macrofungi are very rich in the area (Yang 2005). Many new agarics and aphyllophoroid fungi have recently been described from there (Yang et al. 2004; Dai et al. 2007; Yuan & Dai 2008; Li et al. 2009; Dai 2010, 2011; Li et al. 2011). This paper is another contribution on the lepiotaceous fungi occurring in the region.

The genus *Lepiota* (Pers.) Gray contains more than 400 described species (Kirk et al 2008), and it is reasonable to expect many representatives of this cosmopolitan genus in China. However, rather few taxa have been originally described from China (Chiu 1948, Bi et al 1986, Yang 1994, Tolgor & Li 2004, Wang & Yang 2005a,b). In our research on *Lepiota* in China, in addition to several recently published new species (Liang et al 2009, 2010, 2011, Liang & Yang 2011), several interesting and undescribed taxa still await documentation. The present paper describes one new *Lepiota* species from eastern Himalaya.

Materials & methods

Macro-morphological features were recorded in the field. Material was dried using an electric drier and deposited in the Herbarium of Cryptogams, Kunming Institute of Botany, Chinese Academy of Sciences (HKAS) and Research Institute of Tropical

Forestry, Chinese Academy of Forestry (RITF). Terminology for descriptive terms follows Vellinga & Noordeloos (2001). Color designations are from Kornerup and Wanscher (1981).

For microscopic observations, sections of fruitbodies were made by hand and mounted in 5% KOH, Congo red, and Melzer's reagent. Basidiospores were mounted in cresyl blue to test for a metachromatic reaction (Singer 1986). Size ranges were determined for basidia, basidiospores, cheilocystidia, and elements of the pileipellis, based on ocular micrometer measurements of at least 20 elements of each character. The abbreviation [n/m/p] indicates that measurements were made on n basidiospores in m basidiomata from p collections. Dimensions of basidiospores are given using a notation of the form (a–)b–c(–d). The range b–c contains a minimum of 90% of the measured values. Extreme values are given in parentheses. The following abbreviations are used: Q refers to the length/breadth ratio of basidiospores; **Q** refers to the average Q of all basidiospores ± sample standard deviation.

Taxonomy

Lepiota pallidiochracea J.F. Liang & Zhu L. Yang, **sp. nov.** Fig. 1–4

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Pileus sordide albus, squamulis densibus, rubro-ochraceis, rubro-brunneis vel brunneis. Stipes subcylindricus, squamulis brunneis. Basidiosporae 9.0–12.0 × 6.0–9.0 µm, ellipsoideae vel lato fusiformes. Cheilocystidia diversa, clavata, fusiformia vel hamata. Pleurocystidia nulla. Squamulae pilei ex trichodermiis attenuatis terminalibus compositae. Fibulae praesentes.

Type: China, Tibet, Changdu Co., near Qiongka Bridge, 27 July 2004, Zhu L. Yang 4194 (HKAS 45579 **holotype**).

Etymology: *pallidiochracea* (Lat.), referring to pale ochraceous squamules on the pileus.

Basidiomata (Fig. 1) small-sized. Pileus 1.5–4 cm diam., campanulate with small umbo when young, plano-convex with obtuse umbo at maturity, cream to whitish, at centre brownish red (10D6-8) to dark brown (9E4-8), around centre densely covered with concentric squamules; squamules more or less uplifted, minute, ochraceous-red (8C7-8), brown (7D8) to reddish brown (9C7-8). Lamellae free, subventricose, moderately crowded with lamellulae, dirty white to cream. Stipe 2–4 × 0.2–0.3 cm, subcylindrical, hollow; surface glabrous and white at the apex, light ochraceous (7C6-7) with scattered ochraceous-red (8C7-8), brown (7D8) to reddish brown (9C7-8) squamules at the low part. Annulus whitish, membranous, evanescent. Odor none. Taste not recorded.

Basidiospores (Fig. 2) [63/3/2] 9–12(–14) × 6–8(–9) µm [Q = 1.29–1.85, **Q** = 1.56 ± 0.18], ellipsoid to oblong, sometimes ovoid with small hilar appendage in side view, with neither suprahilar depression nor germ pore, ellipsoid in frontal view; hyaline, smooth, slightly thick-walled, dextrinoid, weakly congophilic, not metachromatic in Cresyl Blue. Basidia 25–37 × 9–14 µm, clavate, 4-spored, rarely 2-spored. Lamella edge sterile. Cheilocystidia

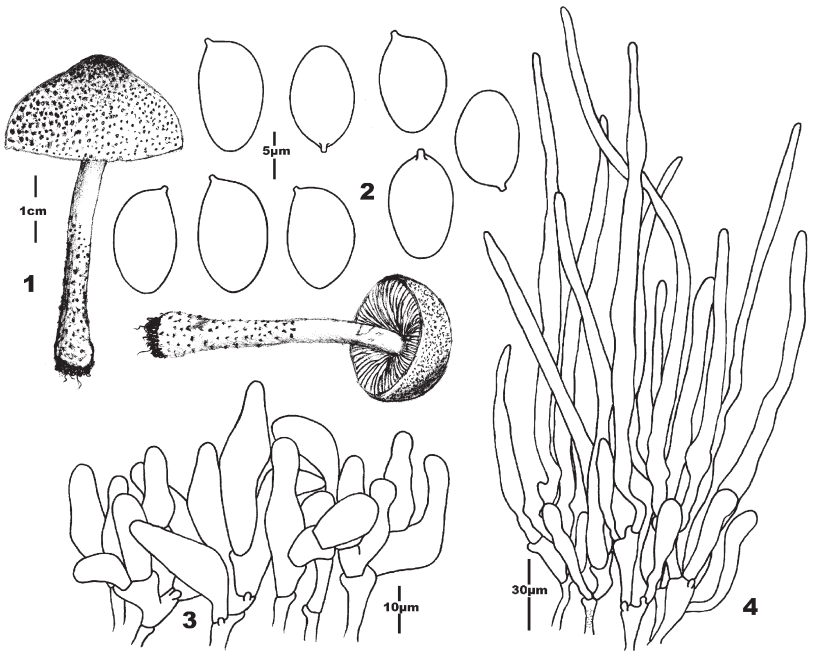

Fig. 1–4 *Lepiota pallidiochracea* (All from holotype, HKAS 45579).
1. Basidiomata. 2. Basidiospores. 3. Cheilocystidia. 4. Pileus covering.

(Fig. 3) 15–40 × 5–10 μm, variable in shape, subcylindrical to narrowly clavate, or fusiform, lageniform to utriform; walls smooth, thin, hyaline in KOH, congophilic. Pleurocystidia absent. Pileus covering (Fig. 4) a trichodermium of elongate, apically attenuate terminal elements 60–256 × 6.5–11 μm, often with some short narrowly clavate elements interspersed, with pale yellowish brown parietal and intracellular pigment in upper part; fine incrustation sometimes in basal part of elements. Clamp connections common.

Additional specimen examined: **CHINA: Yunnan Prov.**, Shangri-La County, Daxiagu, alt. 3060 m, 20 July 2008, Jun F. Liang 799 (RITF 660).

Habitat & distribution: in small groups, gregarious, saprotrophic and terrestrial on slope, in summer. Known only from southwestern China.

Discussion: *Lepiota pallidiochracea* is characterized by its ochraceous-red squamules on the pileus, which is covered with a trichodermium of long, elongate, apically attenuate and short narrowly clavate elements, large ellipsoid to oblong spores, and polymorphic cheilocystidia.

Based on the trichodermium type of the pileus squamules and the ellipsoid basidiospores, *L. pallidiochracea* may tentatively be placed in *L.* sect. *Ovisporae*

(J.E. Lange) Kühner (Singer 1986, Vellinga 2001), although species in the section usually have spores smaller than 10 µm (Singer 1986). Recent molecular phylogenetic studies indicate that section *Ovisporae* is not monophyletic, so that re-evaluation of this section is needed (Vellinga 2003, Liang et al 2011). Phylogenetically, the new species may be referred to section *Lepiota* or clade 1 of *Lepiota* s.l. (Vellinga 2003) until a new taxonomic system is proposed.

Several *Lepiota* species have similarly shaped spores. The polymorphic cheilocystidia coupled with the larger spores help distinguish *L. pallidiochracea* from *L. brunneolilacea* Bon & Boiffard (also a member of *L.* sect. *Ovisporae*), *L. helveola* Bres. and *L. ochraceoaurantiaca* Dennis (Bon 1996, Candusso & Lanzoni 1990, Dennis 1952). The larger spores are reminiscent of *L. oreadiformis* Velen. (in sect. *Lepiota*), which, however, has much larger, fusiform to amygdaliform spores and narrowly clavate or utriform cheilocystidia (Vellinga 2001).

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